

ABSTRACT

[37] An active voltage limiting and failure detection system for an energy storage cell of a multiple energy storage cell pack includes a first electrical circuit and a second electrical circuit connected to the energy storage cell. The first electrical circuit is powered by the energy storage cell and includes means for drawing a significant amount of power from the energy storage cell when a cell voltage V_{cell} reaches a maximum voltage V_{max} to reduce the cell voltage V_{cell} , means for stopping the drawing of the significant amount of power to reduce the cell voltage V_{cell} when the cell voltage V_{cell} reaches a minimum voltage V_{min} , and means for drawing no power when the cell voltage V_{cell} reaches a shutdown voltage $V_{shutdown}$. The second electrical circuit includes means for indicating a cell active condition when the cell voltage V_{cell} is above a threshold active voltage V_{active} , and means for indicating a cell inactive condition when the cell voltage V_{cell} drops below the threshold active voltage V_{active} .